***In the Claims*:**

Please amend Claims 1, 4 and 7 and cancel Claims 9-12 and 26. The following listing of claims will replace all prior versions, and listings, of claims in the application.

1. (currently amended) A tissue engineered structure comprising:

a substrate defininghaving micromachined surface structures ~~provided thereon~~, wherein said micromachined surface structures includecomprise nanotopographic features ~~superimposed thereon~~, the nanotopographic features having a first portion configured to enhance adhesion of a first cell type and a second portion configured to enhance adhesion of a second cell type and being arranged in such a manner so as to localize and organize the first and second ~~multiple~~ cell types into desired subassemblies within said micromachined surface structures;

a first cell type seeded microfluidically, and organized and localized on the substrate by the first portion to form a first subassembly; and

a second cell type seeded microfluidically, and organized and localized on the substrate by the second portion to form a second subassembly.

2. (currently amended) The substrate as recited in claim 1, wherein one or more micromachined surface structures defines ~~the~~ walls and floor of a channel.

3. (original) A substrate as recited in claim 1, wherein the nanotopographic features facilitate adhesion of one or more cell types.

4. (currently amended) A substrate as recited in claim 2, wherein the nanotopographic features are oriented to facilitate adhesion to~~preferentially adhere~~ one or more cell types to a desired location on the substrate.

5. (original) A substrate as recited in claim 1, wherein the nanotopographic features are oriented to laterally align one or more cell types.

6. (original) A substrate as recited in claim 1, wherein the nanotopographic features are oriented to form a grid.

7. (original) A substrate as recited in claim 1, wherein the nanotopographic features are generated by a lithographic technique.

8. (previously presented) A substrate as recited in claim 1, wherein the cell types are selected from the group consisting of endothelial cells, smooth or skeletal muscle cells, myocytes, cardiac cells, fibroblasts, chondrocytes, adipocytes, fibromyoblasts, ductile cells, skin cells, hepatocytes, kidney cells, pancreatic islet cells, intestinal cells, osteoblasts, hematopoietic cells and stem cells.

Claims 9-12. (cancelled)

13. (currently amended) A tissue engineered system comprising one or more layers, wherein each layer includes micromachined surface structures having nanotopographic features superimposed thereon, the nanotopographic features being within the micromachined surface structures and arranged in such a manner so as to organize multiple cell types into desired subassemblies within said micromachined surface structures.

14. (original) The system according to claim 13, wherein a semi-permeable membrane is positioned between the layers.

15. (original) The system of claim 13, wherein one or more micromachined surface structures defines the walls and floor of a channel.

16. (original) The system according to claim 15, wherein the channels are divided longitudinally into two compartments by a centrally positioned membrane, and wherein each compartment comprises a different cell type.

17. (original) The system according to claim 13, further comprising a pumping means for circulating fluid through the system.

18. (original) The system according to claim 13, further comprising nutrient supply and excretion removal lines in fluid communication with the system.

19. (original) The system according to claim 13, wherein the nanotopographic features facilitate adhesion of one or more cell types.

20. (currently amended) The system according to claim 19, wherein the nanotopographic features are oriented to facilitate adhesion to ~~preferentially adhere~~ one or more cell types to a desired location on a layer.

21. (original) The system according to claim 13, wherein the nanotopographic features are oriented to laterally align one or more cell types.

22. (original) The system according to claim 13, wherein the nanotopographic features are oriented to form a grid.

23. (original) The system according to claim 13, wherein the nanotopographic features are generated by a lithographic technique.

24. (original) The system according to claim 13, wherein the cell types are selected from the group consisting of endothelial cells, smooth or skeletal muscle cells, myocytes, cardiac cells, fibroblasts, chondrocytes, adipocytes, fibromyoblasts, ductile cells, skin cells, hepatocytes, kidney cells, pancreatic islet cells, intestinal cells, osteoblasts, hematopoietic cells and stem cells.

25. (currently amended) A tissue engineered structure comprising:

a substrate having micromachined surface structures provided thereon, wherein said micromachined surface structures comprise nanotopographic features superimposed thereon, the nanotopographic features being within the micromachined surface structures and having a first portion configured to select a first cell type and a second portion configured to select a second cell type so as to organize the first and second cell types into desired subassemblies within said micromachined surface structures when a population of multiple cell types are introduced onto the surface.

Claim 26. (cancelled)